MULTIFUNCTION TROLLEY
(CHILDREN)

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ABSTRACT

This report is about development of trolley that always seen used. This trolley is normal shopping trolley but added with few multifunction. It also a device which is important in order to ease transportation and to decrease the load when we want to lift or transport heavy items from one place to another. The idea of the fabricating of this trolley is based on student's creativity. The selection of suitable materials in the fabricating of this trolley is a loaded material which has minimum weight, long life-span and can detain heavy load. For this project, the material that Materials that had been use consist of many kind of material such as hollow steel, aluminium, plate steel and others. In this report, we'll also be having more to the fabrication of this trolley.

ABSTRAK

Laporan ini membentangkan tentang troli yang sering kali digunakan. Troli merupakan troli membeli belah yang biasa digunakan tetapi dengan tambahan beberapa fungsi lain. Ia juga suatu perkakas yang penting untuk memudahkan pergerakan dan meringankan beban ketika hendak mengangkat atau mengubah barang yang berat dari satu tempat ke satu tempat. Idea pembentukan troli ini berdasarkan kreativiti pelajar sendiri. Pemilihan bahan yang sesuai untuk digunakan bagi pembentukkan troli ini merupakan bahan yang mempunyai berat yang ringan, jangka hayat yang tahan lama dan boleh menahan beban yang berat. Di dalam projek ini bahan yang dicadangkan dalah teriri daripada beberapa bahan yang berlainan iaitu ‘hollow steel’, aluminum, plate steel dan sebagainya. Dalam laporan ini juga akan lebih memfokuskan kepada pembentukkan troli.

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LIST OF SYMBOLS

A	Area	m^2
g	Gravity	ms^{-2}
m	Mass	kg
W	Total load on beam	kg or N
F	Concentrated force	N

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LIST OF ABBREVIATIONS

MIG	Metal Inert Gas Welding
SMAW	Shielded metal arc welding
UMP	Universiti Malaysia Pahang
DC	Direct Current

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

In human life, there has many things has been developed to make human life easier. Same with trolley, people have develops to make it more function. From that, there has been creating shopping trolley to transport or pick things in supermarket without hard work with added to place baby in the trolley while shopping. From that purpose, shopping trolley for kids also has to produce.

1.2 PROBLEM STATEMENT

For this project, its have few problem statement;

(i) Usually trolley in the market just focused for adult used.
(ii) Usually trolley only focused on one function only

1.3 OBJECTIVE

The objective of this project is to develop and fabricate the suitable multifunction trolley for children.

1.4 SCOPE

For this project, its only limited on the following scope;

(i) This project focused on making a trolley for primary school children.
(ii) This trolley is a portable and multifunction trolley.
(iii)The maximum load can be applied to this trolley is limited to 10 kg.

CHAPTER 2

LITERATURE REVIEW

2.1 BACKGROUND

One of the first shopping carts were introduced on June 4, 1937, the invention of Sylvan Goldman, owner of the Humpty Dumpty supermarket chain in Oklahoma City. One night, in 1936, Goldman sat in his office wondering how customers might move more groceries. He stared idly at a wooden folding chair. Put a basket on the seat and wheels on the legs. [1]

Figure 2.1: Shopping trolley

Source: webzoom.freewebs (2008)

Their first shopping cart was a metal frame that held two wire baskets. Since they were inspired by the folding chair, Goldman called his carts "folding basket carriers". Another mechanic, Arthur Kosted, developed a method to mass produce the carts by inventing an assembly line capable of forming and welding the wire. They advertised the invention as part of a new “No Basket Carrying Plan."[1]

The invention did not catch on immediately. Men found them effeminate; women found them suggestive of a baby carriage. "I've pushed my last baby buggy," an offended woman informed him. After hiring several male and female models to push his new invention around his store and demonstrate their utility, as well as greeters to explain their use, shopping carts became extremely popular and Goldman became a multimillionaire. Goldman continued to make modifications to his original design, and the basket size of the shopping cart increased as stores realized that their customers purchased more as its size increased.[1]

Today, most big-box stores and supermarkets have shopping carts for the convenience of the shoppers. Recent studies determined that cart less retailers such as Sears and J.C. Penney have suffered slow sales in recent years. Retailers that do use shopping carts, Wal-Mart among them, have had booming sales. In large part this could be attributed to the ease of shopping made possible by the shopping cart.[1]

2.2 DESIGN

Trolleys are a type of material handling aid on wheels designed to hold and transport products, tools or supplies and reduce or eliminate the need for lifting. Depending on the types of materials to be transported - trolleys can be plastic, metal or wooden. Wheel type and size can also vary depending on the types of terrain the trolley is traveling over and the work environment and can be lockable.

Figure 2.2: Plastic shopping trolley

Source: made-in-china (2009)

Almost all shopping carts are made of metal or plastic and designed to nest within each other in a line to facilitate moving many at one time, and to save on storage space. The carts can come in many sizes, with larger ones able to carry a child. There are also specialized carts designed for two children, and electric mobility scooters with baskets designed for disabled customers. 24,000 children in the USA are injured each year in shopping carts. Some stores have child carts that look like a car or van with a seat where a child can sit. Such "Car-Carts" or "Beans", as some call them in the cart business, may offer protection and convenience by keeping the child restrained, lower to the ground, protected from falling items, and amused.[2]

Figure 2.3: Yilin shopping trolley

Source: indiamart (2006)

Shopping carts are usually fitted with four caster wheels which can point in any direction to allow maneuvering. However, when any one wheel jams, the cart can become difficult to handle. Many carts only have swivel caster wheels on the front, while the rear ones are on a fixed axle.An alternative to the shopping cart is a small handheld shopping basket. A customer may prefer a basket for a small amount of merchandise.

A collapsible utility cart has a basket pivotally mounted to a forward facing, C-shaped cart frame. Nowadays, trolley became the most important things in transport a product or tools from one place to another.[2]

2.3 TYPE OF TROLLEY

2.3.1 Hospital trolley

It was a trolley that to brought medicine in the room. It was made to make a easier way for the nurses to brought the medicine from room to the another room. Besides that, it has many partition of space that can put a number of different medicines in the trolley.

Figure 2.4: Plastic hospital trolley

Source: accesshealth (2008)

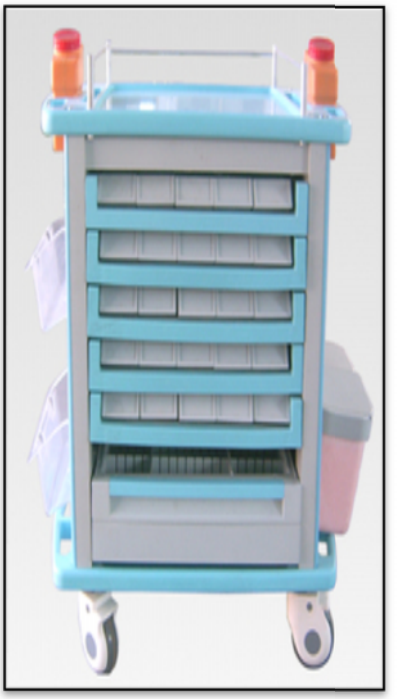

Figure 2.5: Steel shopping trolley

Source: hisupplier (2008)

2.3.2 Baggage trolley

Luggage carts or Trolleys are small vehicles pushed by travelers (human-powered) to carry individual luggage, mostly suitcases. There are two major sizes: One for big luggage and one for small luggage. Carts have usually two parts for carrying luggage: A small section (basket) for Carry on luggage at the same level as the handle, and a lowered large section for suitcases and large bags. The carts are provided in airports, large bus stations, Hotels or train stations for transporting luggage and may be free of charge. They are sometimes owned by the operator of the establishment. In some facilities carts may be provided by a contractor such as Smart Carte for a rental fee. Below shown example of baggage trolley that usually use in hotel or airport.[2]

Figure 2.6: Trolley for bag

Source: alibaba (2007)

2.3.3 Shopping trolley

A shopping cart (also called trolley, carriage, shopping carriage, buggy, bascart, & basket) is a cart supplied by a shop, especially a supermarket, for use by customers inside the shop for transport of merchandise to the check-out counter during shopping, and often to the customer's car after paying as well. Often, customers are allowed to leave the carts in the parking lot, and store personnel, referred to as cart attendants, return the carts to the shop.[6]

Figure 2.7: Children trolley

Source: toysandinteriors (2007)

Figure 2.8: Trolley

Source: germes-online(2008)

2.4 BASIC PART

Basically the basic or the main part that usually use for trolley are;

(i) **Wheel**: Usually made from rubber that joined together with the bolt and nut with steel frame to ensure strength.

(ii) **Body**: For outdoor use such as warehouse or workshop that requires full strength of body, wire frame or sheet metal body is used. Some trolley doesn't have any body on it on purpose.

(iii)**Handle Bar**: Usually all the trolley must have handle to provide less effort while using the trolley due to heavy it's loading.

2.5 JOINING METHOD

Joining involves in assembly stage. Commonly used method to join metal part is Metal Inert Gas (MIG) welding.

Figure 2.10: Metal Inert Gas (MIG) Welding

Source: thefabricator (2008)

2.5.1 Metal Inert Gas (MIG) Welding

MIG (Metal Inert Gas) or as it even is called GMAW (Gas Metal Arc Welding) uses an aluminum alloy wire as a combined electrode and filler material. The filler metal is added continuously and welding without filler-material is therefore not possible. Since all welding parameters are controlled by the welding machine, the process is also called semi-automatic welding.[3]

There are two different MIG-welding processes, conventional MIG and pulsed MIG:

(i) Conventional MIG uses a constant voltage DC power source. Since the spray transfer is limited to a certain range of arc current. This also limits the application of conventional MIG to weld material thicknesses above 4 mm. Below 6 mm it is recommended that backing is used to control the weld bead.

(ii) Pulsed MIG uses a DC power source with superimposed periodic pulses of high current. In this way pulsed MIG is possible to operate with lower current and heat input compared to conventional MIG. This makes it possible to weld thinner sections and weld much easily in difficult welding positions.

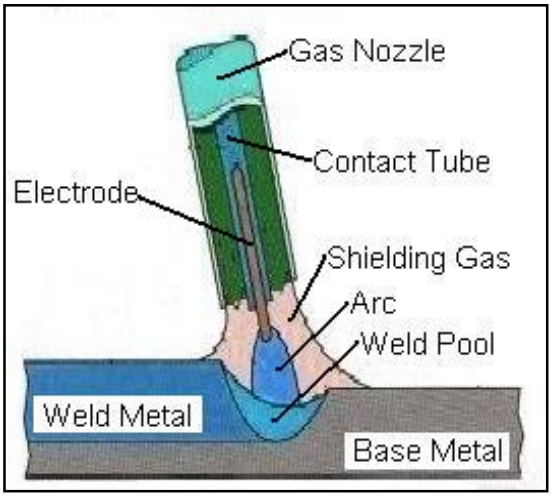

Figure 2.11: Schematic of Metal Inert Gas (MIG) Welding

Source: weldingengineer (2005)

Gas Metal Arc Welding (GMAW) is frequently referred to as MIG welding. MIG welding is a commonly used high deposition rate welding process. Wire is continuously fed from a spool. MIG welding is therefore referred to as a semiautomatic welding process.

2.6 DRILLING PROCESS

Drilling is easily the most common machining process.. Drilling involves the creation of holes that are right circular cylinders. This is accomplished most typically by using a twist drill, something most readers will have seen before. The chips must exit through the flutes to the outside of the tool. As can be seen in the figure, the cutting front is embedded within the work piece, making cooling difficult.[4]

2.6.1 Drill Press

A typical manual drill press is shown in the figure below. Compared to other powered metal cutting tools, a drill press is fairly simple, but it has evolved into a versatile necessity for every machine shop.

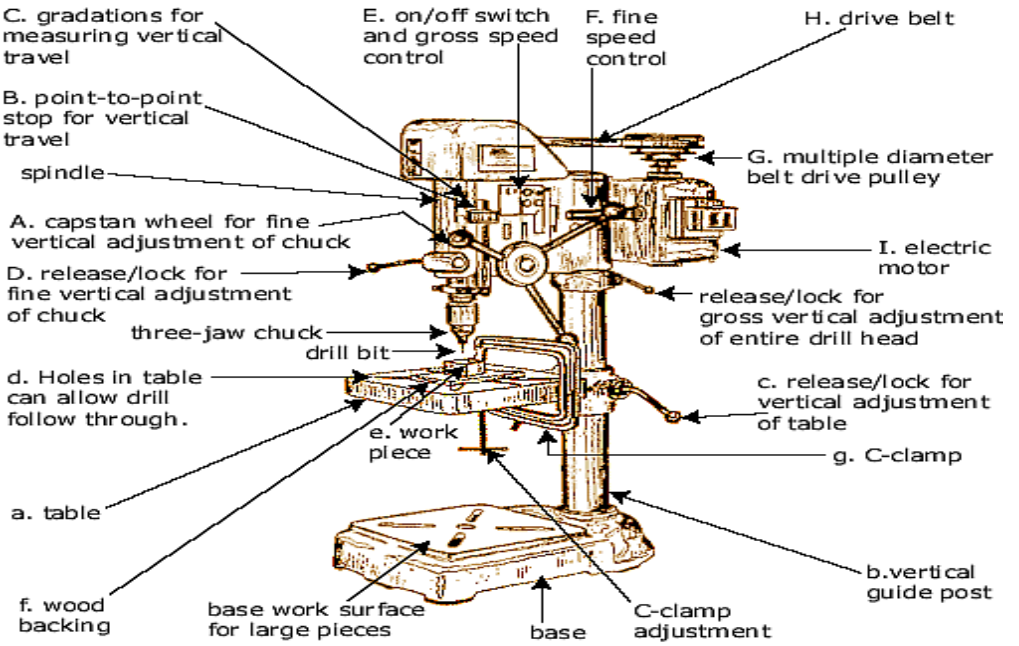

Figure 2.12: Drill Press Machine

Source: efunda (2007)

2.7 GRINDING PROCESS

Grinding is a finishing process used to improve surface finish, abrade hard materials, and tighten the tolerance on flat and cylindrical surfaces by removing a small amount of material. Information in this section is organized according to the subcategory links in the menu bar to the left.

In grinding, an abrasive material rubs against the metal part and removes tiny pieces of material. The abrasive material is typically on the surface of a wheel or belt and abrades material in a way similar to sanding. On a microscopic scale, the chip formation in grinding is the same as that found in other machining processes. The abrasive action of grinding generates excessive heat so that flooding of the cutting area with fluid is necessary.[5]

Figure 2.11: Grinder

Source: directindustry (2008)